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## FOSSIL SHARKS AND RAYS OF THE PACIFIC SLOPE OF NORTH AMERICA

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This memoir is supplemental to two papers: "The Fossil Fishes of California," Jordan, Univ. Cal. Publ. Geology V. No. 7, pp. 95-144, 1907; "Supplementary Notes on Fossil Sharks," Jordan and Carl Hugh Beal, op. cit. VII, No. 11, p. 243-256, 1913, based on the same material, to which have been added various other collections from deposits, chiefly of Miocene Age, in Southern California. These additional series may be enumerated as follows:

- I. Geological Collections of Stanford University, containing, besides the material previously examined, numerous other specimens from different sources, as indicated below.
  - (a) Kern County Miocene: The East-central part of Kern County is occupied by barren rounded hills composed of thick-bedded, friable, loosely cemented, mealy material known as Arkose. This is a rotten granite containing fragments of feldspar, quartz and epidote, washed down by Kern River from the Sierras. This deposit overlies the oil-bearing rocks which center at Oil City on Kern River three or four miles north of the City of Bakersfield. In it sharks' teeth are relatively abundant, together with teeth of Sea lions, bones of Sea-lions and whales and occasional teeth of an extinct sea-cow. It is probable that teeth exist throughout this deposit, but it can be examined only where exposed by erosion.

The principal localities known are the following: (a) **Shark-tooth Hill**, on the north side of Kern river, about four miles east of Oil City (recorded beyond as "Shark-tooth Hill").

This and Barker's Ranch in the same neighborhood have been especially studied by Charles Morrice, Secretary of an Oil Company at Oil City, and also by John Barker and by Frank B. Anderson of the California Academy of Sciences. A large collection from Anderson and Barker was sent to the Academy and was studied by Jordan before the earthquake-fire of 1906, in which all except a few duplicates sent to Stanford University were destroyed.

A still larger collection was made in 1913 by Mr. Morrice about Shark-tooth Hill at Mr. Anderson's suggestion, and sent in part to the California Academy of Sciences, in part to Stanford University. This series was the basis of the report of Jordan and Beal in 1913.

More recently, (June 1, 1923), the senior author of this paper visited this region, and Mr. Morrice turned over to Stanford University still another series, not less extensive